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MINUTES OF
SUBCOMMITTEE ON ATMOSPHERIC POLLUTANTS
OF THE
MEDICAL ADVISORY COMMITTEE OF API

Meeting called to order at 9 a.m., November 12, 1957.

I. All members of the Subcommittee were present

N. J. Gothard	Sinclair Refining Co.	Harvey, Ill.
R. M. Landon	Gulf Oil Corp.	Pittsburgh, Pa.
Charles A. Jones	API Smoke & Fumes Committee	Wilmington, California
Louis Mittelman	Tidewater Oil Co.	Associated, California
C. T. Brown	Richfield Oil Corp.	Los Angeles
L. E. Curtis	Standard Oil of Calif.	San Francisco
Paul D. Halley	Standard Oil of Indiana	Chicago
A. C. Pabst	Socony Mobil Oil Co.	New York City
F. W. Church	Esso Research & Engineering	Linden, N. J.
N. V. Hendricks	Esso Research & Engineering	Linden, N. J.
J. A. Spence	Standard Oil of Calif.	San Francisco
William L. Avrett	Standard Vacuum Oil Co.	White Plains, New York
J. H. Johnston	Imperial Oil Ltd.	Toronto, Can.
T. B. Rendel	Shell Oil Co.	New York
C. H. Hine	Shell Development Co.	Emeryville
R. E. Eckardt	Esso Research & Engineering	Linden, N. J.
L. E. Renes	Phillips Petroleum Co.	Bartlesville, Oklahoma
Clark R. Miller	Tidewater Oil Co.	San Francisco
E. K. Daniels	General Petroleum Corp.	Los Angeles
Richard Cull	Union Oil Co. of Calif.	Los Angeles
John C. Ruddock	Richfield Oil Corp.	Los Angeles

II. Minutes of a meeting held in San Francisco on September 16 were approved as submitted with modifications.

III. The Chairman reviewed the general subject of air pollution and cited the advances and progress being made on the subject of air pollution.

IV. The Chairman reported directly on the meeting of the Technical Research Subcommittee of the Smoke and Fumes Committee of the API.

- a. Preparation of a manual for guidance of plant engineers to determine gas dispersion
- b. Develop a portable ozone detector

- c. Progress report concerning the continuous perpetual reactions of nitrous oxides and other organic material in the formation of ozone. Also the part played by various types of fuels and the effect of exhaust gases from these fuels on eye irritation
- d. Report by Dr. Middleton of the University of California on the "Effect of Organic Material on Plants". Results of this study to date are:

Dr. Middleton has never been able to demonstrate plant damage from auto exhausts or synthetic smogs. Plant damage does occur in the fields and from which he concludes that there is an unknown substance that enters into the reaction causing plant damage

This project is to be continued with the addition of experiments correlating the plant damage work with eye irritation.

- e. The work of Dr. Johnstone of the University of Illinois concerning S-SO₂-SO₃ mixtures towards formation of H₂ SO₄ when mixed with fogs was reported.

The hazards to human beings of SO₂-SO₃-H₂-SO₄ aerosols was referred to the Medical Advisory Committee for a statement on the toxic effects of these mixtures as they occur in smog.

It was requested by this Technical Subcommittee that the Medical Advisory Committee prepare a statement bringing up to date the true status of the effects of atmospheric pollutants on human health as related to the petroleum industries responsibility. This was desired in order to combat in a positive manner publicity which is being circulated throughout the nation by the press.

Action by the Subcommittee

- 1. A complete discussion was entered into by all members concerning the use of \$20,000 to determine and conclude by a critical evaluation of all past, present and contemplated research on the effects of air pollutants on human beings with respect to physiology, pathology and taking into consideration the precipitation or the aggravation of diseases.

By unanimous approval the Subcommittee will invite Dr. Goldblatt of London, England to participate and secure his placement on the faculty of the University of California Medical School as a lecturer. His full time will be devoted to this project under specifications as laid down by the Subcommittee on Atmospheric Pollutants.

Dr. Goldblatt will be entitled to the use of the University's staff and its facilities in furthering the aspects of this project.

Details on the exact money consideration within our allotment will be worked out at an early date.

2. Three statements have been prepared by members of the Subcommittees and are attached hereto. They are to be combined into one statement by one of the API staff members and then submitted through the Smoke and Fumes Committee to the appropriate publicity committee for distribution.
3. Mr. T. B. Rendel was charged with the responsibility of accumulating information concerning the hazards of S-SO₂-SO₃-H₂-SO₄ aerosols to be submitted to the Technical Research Subcommittee of the Smoke and Fumes Committee. This statement will be reviewed by the MAC at its next regular meeting.

The meeting was adjourned at 12:25 p.m.

J. C. Ruddock, M.D.
Chairman

Suggested Statement Concerning the Effects of Air Pollutants on the Health of Man

The Medical Advisory Committee of the American Petroleum Institute is vitally interested in the problem of community air pollution. In order to facilitate an understanding of the problem, a special committee of qualified physicians, industrial hygienists and technical advisors was created in 1950. This group, called the Subcommittee on Atmospheric Pollutants, has carefully and critically followed developments in the matter of the effects on health of individual and single air pollutants since that time. This interest stems not from the belief that any serious effect on health is created by the production, manufacture, transportation and use of petroleum products, but rather that the experience of physicians with special knowledge of the effect of environment on man might be of help in understanding the perimeters of possible effects on human health created by pollutants in the atmosphere. The Medical Advisory Committee emphasizes that of the four occurrences of reported increased mortality which have occurred throughout the world due to the acute effects of community air pollution, none of these was contributed to, or caused, by petroleum products. Scientific investigation supported in part by other technical groups in the API has shown, however, that under certain conditions, petroleum products, chiefly from automobile exhaust, may undergo a series of chemical reactions resulting in unknown reaction products which may cause eye and mucous membrane irritation. These effects, insofar as modern medical knowledge can describe them, disappear when the air pollution ceases, and this occurs without known residual effects. The Medical Advisory Committee believes that there are no significant deleterious effects on health resulting from either single or prolonged exposure to air pollution as is known in this country. However, in order to obtain the best information concerning possible effects of air pollutants on health, the Medical Advisory Committee members, both individually and collectively, have recommended that investigations aimed at determining any interference with the physical, mental and social wellbeing of the people be pursued with vigor. On the other hand, the Medical Advisory Committee feels that unwarranted and tenuous charges which cannot be sustained by laboratory data or clinical and statistical results should not be thoughtlessly disseminated. In particular, it feels that any direct implication of petroleum products contributing to chronic, degenerative and malignant diseases is unwarranted and unjustified. The Committee would like to emphasize that there is no data at present to indicate that air pollution, in general, and that which may be contributed to by the use of petroleum products specifically, in any way affects any of the following: mortality of persons exposed to community air pollution, sickness experiences of the general population or of particular age or disease groups, increase in any type of illness, or gross psychological or mental effects.

Finally, the members of the Medical Advisory Committee have indicated their willingness to cooperate with other professional and medical groups interested in the medical aspects of air pollution so that unresolved problems may be clarified.

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The Effect Of Atmospheric Pollutants On Health

API 07315

The last few years have witnessed an increasing amount of atmospheric pollutants over the larger cities in this country. The immediate reaction on the part of the public was one of annoyance from the irritation caused to their eyes and the respiratory system. Later there developed a more ominous feeling that such pollutants may have a dire effect on the overall health and longevity of those exposed to such contaminants.

The result of such deep seated public concern from these potential hazards has been a great deal of investigative work carried out by Foundations, Universities, Research Institutions and other similar bodies. This investigative work, actively

sponsored by the Petroleum Industry, has investigated air pollution from many aspects. In some areas the work has been precise and informative while in others the results have been doubtful and unreliable.

As physicians we are primarily interested in the impact of air pollution on human health. Unfortunately the public has been all too frequently and unduly alarmed and excited by much publicized experimental work which, although imaginative and dramatic, has not been confirmed by other investigators or necessarily applicable to human beings. Some of this much publicized research work has been done under totally abnormal physiological conditions and only on a few species of laboratory animals. Any attempt to equate these results against the effect of air pollution on man is not only very difficult but invariably leads to erroneous and dangerous conclusions. It is most unfortunate that the press has seen fit to highly publicize such results, for the impact on the public is not only disquieting but adds to the general confusion in this already highly speculative field.

However, from the carefully performed and well documented research work of the past few years, certain tentative conclusions can be reached on the effect of air pollution on health.

- 1) In the very rare instances of extreme air pollution such as occurred in the Meuse Valley, Donora and London, the death rate was accelerated. Even in these extreme instances it is chiefly the very young, chronically ill and elderly who are affected. Such instances are extremely rare and occur only under the unusual circumstances of extreme domestic and industrial air pollution, certain meteorological conditions such as inversion and fog acting on certain highly susceptible people.
- 2) Air pollution, such as encountered in the Los Angeles Basin, is capable of mild, fleeting inflammation to the eyes, nose, throat and lungs. The symptoms are chiefly those of irritation, such as sensation of burning and smarting of the eyes, sneezing and coughing. Such a reaction, annoying as it may be, can be classified only as a nuisance. Shortly after the air pollution has been removed, the irritation ceases and the symptoms subside. Some medical authorities feel that repeated irritation of this nature may aggravate chronic, underlying diseases of the respiratory tract, but there is no conclusive evidence that such repetitive irritation can cause any significant unhealthy condition.
- 3) Certain research workers in the field have proposed a theory that certain agents found in air pollution are directly responsible for the increased rate of lung cancer. It has been demonstrated that certain known cancer producing agents such as benzpyrene have been repeatedly isolated from the atmosphere of industrial cities. Also there are unconfirmed reports which unfortunately have received wide publicity that atmospheric pollutants have produced skin and lung cancer in certain animals under highly selective circumstances. However, the reports and statistics in this field are so highly contradictory and conflicting that at this time it is not possible to intelligently evaluate the significance of air pollutants as a causative factor of lung cancer. Furthermore it is not known whether these cancer producing agents are found in adequate quantity and over a sufficient length of time in the atmosphere to be of any true significance. Their mere presence in the atmosphere is not conducive nor even presumptive evidence that they have a harmful effect on the population.

The obvious area of confusion and uncertainty is the long term, chronic effect of air pollution on health. Of major concern is whether these pollutants cause serious and perhaps irreversible, inflammatory changes in the eyes, sinuses and lung tissue. The more serious area of the relationship of air pollution and lung cancer still remains to be properly explored. The highly publicized reports of a few scattered workers in this field have undoubtedly alarmed the public and have

given a highly exaggerated distortion of our actual knowledge. Both the statistical and laboratory evidence in this area is conflicting and sketchy. With our present knowledge it is not possible to come to any intelligent conclusion as to whether one or more air pollutants is a causative or even an accelerating factor in the production of any form of chronic disease or malignancy in the population so exposed.

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Statement On Atmospheric Pollution

Little is known as yet concerning the exact effect of "smog" (air pollutants) on human health. Reports have been received from many sources concerning the effect of particular chemical gases, particulate matter, elements and chemical aerosols on experimental animals. The dosages to which these animals have been subjected are not realistic, inasmuch as the human being is very seldom if ever exposed to the amounts of pollutants to which experimental laboratory animals are exposed. Our technical brethren still inform us that there are unknown constituents in air pollutants that plague our cities. Projects are still progressing in order to determine the source of these unknowns. Much progress is being made, as for example the determination of the source and the mechanism of synthesis of substance "X" as described by the Franklin Institute in Philadelphia. Much technical knowledge has been produced after laborious investigations by institutions financed and supported by the American Petroleum Institute, the Western Oil and Gas Association and many others under the auspices and direction of institutes, universities, air pollution districts, governmental agencies and others.

Reported experience of medical men in areas where "smog" is frequent indicates that air pollution may be detrimental to well being. How serious a threat this may be has not been established. Well being would be interpreted as meaning that the individual has no complaints, annoyances, anxieties, aches, pains or symptoms of diseases. No proof is yet available that air pollutants have caused pathological effect on human beings per se. Epidemiological surveys have concluded that air pollutants irritate mucous membranes of the respiratory tract and the eyes. It has also been concluded from these surveys that individuals who are already afflicted with chronic bronchitis, emphysema, bronchiectasis, asthma and other pulmonary disturbances do have an aggravation of their symptoms, but no proof is yet available that it aggravates the disease itself. Epidemiological studies based upon the observations of a few doctors conclude that the aged, the infirm, the allergic and the very young are adversely affected by air pollutants.

Man has for centuries been exposed to smoke. We know that smoke (carbonaceous particulate matter) does cause irritation and eye smarting and aggravates and precipitates coughing. This effect of smoke is dependent entirely upon the concentration of smoke in the atmosphere. Forest fire fighters, city firemen and certain job classifications in industry as well as tobacco smokers do become accustomed to this exposure and contact. Many of these exposed people do have immediate effects and it is only a few who have residual effects when removed from the offending pollutants in the atmosphere.

Human beings and other vertebrates have characteristics which are not present in inanimate material. The human being has a defense mechanism physiologically against all types of foreign matter and diseases. This defense mechanism sets up a resistant barrier against intrusion and then heals any lesions that might occur so that there may be no evidence of an offending material after nature has repaired any damage or after resistance of the offending material before damage has occurred; thus, no residual may be evident by symptomatic manifestations. Threshold values must be established in order to determine what amount of a material will cause an acute affect on the human being by the manifestation of symptoms and a response by

the individual which may be uncomfortable, i.e., a difference from a normal sense of well being.

Qualitative analysis of air pollutants is not sufficient to determine the effect of air pollutants on a human being. It is necessary that the quantitative analysis of a substance be determined as well as the time to which an individual is exposed to that substance. One can be exposed to fire for a fraction of a second without harm, but if he is continuously exposed to the same amount of fire, he will be burned and if continued longer will be completely reduced to ashes. It is therefore necessary that any medical evaluation of effect of air pollutants on the human being must begin first with the technical knowledge of the quantitative amount of the pollutants concerned plus the time of exposure.

Many gaseous elements occur in our atmosphere naturally. Oxygen, hydrogen and nitrogen are the three common constituents of air. Each as an element alone is without medical significance. It is only when these substances are combined with organic complex compounds or with other elements in a gaseous form or together that they constitute a hazard, either toxic or as irritants. Sulfur, as an element, is an innocuous substance but when combined with hydrogen or oxygen or both in a gaseous state may be harmful, poisonous or escharotic (H_2SO_4). Combinations of nitrogen and oxygen and combinations of carbon and hydrogen with the resulting complex organic compounds may constitute hazards. Many of these organic compounds have been qualitatively recognized in our technical researches on air pollution which include the hydrocarbons, both the aliphatic group and the aromatic group with resultant further synthesis into highly complex substances with the addition of sunlight.

In addition to this we have many aerosols of compounds that are present qualitatively among the air pollutants of the atmosphere which in turn may be synthesized into further complex substances. We have the gases and elements of chlorine, bromine and iodine which are exceedingly irritating and suffocating. We have dust and particulate matter including water, carbon and other non-gaseous elements. We have recognized qualitatively many, many substances. We are still finding others. The entire aspect of air pollution is very complex. Many of the elements are essential to life. Many combinations of these elements are extremely toxic and irritating. Text books on hygiene attempt to set a threshold quantitative evaluation on these elements (which is a demarcation between good effect, no effect and bad effect) which is not real, when we consider the remarkable synthesis that is continuously present and the effect of meteorological phenomena causing, in certain areas, "smog". The petroleum industry has been accused as one of the main sources of air pollutants that cause effect upon individuals making up the population of an area. Researches at the present time have definitely shown that the petroleum industry is not the only cause of air pollutants resulting in lower visibility, eye smarting or precipitating respiratory symptoms. Automobile exhaust or refuse burning or the fumes resulting from other industries are a factor.

Researches and experiments are being undertaken by control districts in determining the principal cause of presumed harmful features of eliminating or suppressing fumes emitted by various sources. In the Los Angeles area the control district has eliminated the burning of refuse by incinerators. It is possible that a combination of three factors or one factor only may be the etiological source. The full facts are not yet known about any of these possible sources. If investigators express the opinion that the oil industry alone is responsible or is at least the most important cause for the irritating and annoying affects of "smog", then if such a view is accepted as a fact, it will inevitably have the result of reducing research with respect to other possible causes. We cannot expect the public to put up millions of dollars for investigation for other possibilities if everyone thinks the answer has been found.

Today, thanks to U. S. Public Health Service financial support, there has been published by the Kehoe Laboratories a volume entitled, "annotated Bibliography - The Effects of Atmospheric Pollution on the Health of Man - 1957". This volume is a summary of world literature and of the research that has been done concerning the effect of various substances that have occurred as air pollutants on the human being. There is no correlation or evaluation of these individual researches as yet or an attempt to evaluate them in conjunction with local area problems. These individual researches on individual compounds and elements are useful to all those involved in the elimination of air pollution and its presumed harmful effect.

If we conclude that "smog" or air pollution is responsible for diseases peculiar to the exposure, or for the increased morbidity rates of cancer, or for the aggravation of existing diseases, we must approach the problem as a whole and not from the standpoint of individual constituents. If we approach it from individual constituents of compounds or elements that do exist qualitatively in areas where air pollution is frequent, then before conclusions are made it is necessary that threshold values of human tolerance be established, and that quantitative amounts of such substances as carcinogens occur in sufficient amount to be the cause of cancer, or other substances occur sufficient to produce human disease, taking into consideration exposure time. These questions are as yet unanswered and it may be that a number of years must pass before our statistics can gather such information.

In summary, therefore, the Subcommittee on Atmospheric Pollutants of the Medical Advisory Committee subscribes to the above statement and they are constantly alert and attempt to keep themselves continuously advised of all research work which has to do with the human physical effects of air pollutants in relation to the individual and the community problem.

When the medical division as represented by the Medical Advisory Committee of the A. P. I. is advised, or becomes aware through medical research reports, of the quantitative amount of the elements constituting "smog" or air pollutants, with time of exposure to these quantitative amounts, then the pharmacology of air pollution may be determined with the physiological effects on the human being. This would call for special technical medical investigation either in our laboratories or through field surveys. The Subcommittee on Air Pollutants is interested in the air pollution problem generally and is especially interested in all elements of air pollution that may have their etiological sources directly or indirectly from the production, manufacturing, transportation, storage or use of petroleum products. Harmful effects of air pollutants can be very definitely summarized in the following triad:

1. How much quantitatively of harmful substance "X" is in the atmosphere?
2. What are the physiological effects quantitatively, immediately and after long time exposure?
3. What can be done medically to counteract immediate or long time exposure by the medical profession?

REPORT OF THE A.P.I.-MAC SUBCOMMITTEE ON
C9-C12 AROMATICS

The meeting convened in Dining room #9, Conrad Hilton Hotel in Chicago, at 2 P.M. 11/9/57. Subcommittee members present were T. M. Frank, Jack Spence, R. D. Bent, Jim Hammond for V. C. Baird, & Kieffer Davis. Visitors present were Clark Miller, R. C. Cole, and L. E. Renes.

The chief investigator, Dr. Carl Nau, reviewed the work completed to date, emphasizing points of progress since the April '57 meeting of this subcommittee in St. Louis. Some of the more significant findings are:

1 - Acute inhalation L D 50 toxicity studies reveal that C11 -C12 aromatics are more than 10 times as toxic as benzene. The L D 50 in C9-C10 aromatics was found to be more than three times that of benzene.

2 - In the chronic inhalation studies no consistent changes have been noted in the gross hematology - including the D N A and nucleated cell count of the rat. Although it is not included in the present progress report, the investigator has observed a rather persistent lymphopenia in differential cell counts in rat exposure to benzene, C9-C10. There is an unexplained greater frequency of lymphosarcoma in the peritoneal cavity of rats exposed to any of the test material in comparison with the controls. Mice exposed to 1000 & 2000 P P M benzene or C9-C10 aromatics develop a significant drop in white blood cell count, whereas those exposed to 500 P P M C11-C12 aromatics or 1000 P P M n-decane experience no such changes. Using these concentration levels the mouse cannot tolerate more than 2 - 3 hours of exposure without succumbing. Furthermore, because of the smallness of the long bones of the mouse, it is difficult to obtain bone marrow in samples representative enough for accurate D N A evaluation and nucleated cell count studies.

A sufficient number of rabbits have not yet been tested to reveal any conclusive data, however, there are indications now that exposure to 1000 P P M and 2000 P P M benzene causes a reduction in W B C count. The hematologic findings are inconclusive at this time on rabbits being exposed to C9-C10 or C11-C12. Rabbits exposed to n-decane show no blood changes.

3 - During the course of the inhalation experiments it was noted that:

- (a) the rabbit developed a very severe conjunctivitis, to C11-C12 exposure, and a slight conjunctivitis from C9-C10 exposure.

- (b) Rabbits exposed to C9-C12 aromatics also developed crusting and scaling of skin and loss of hair. When affected areas were covered with vaseline, recovery occurred even in the presence of continued exposure. No similar effects were noted in rabbits exposed to benzene or n-decane. These findings were demonstrated by color slides.

4 - In view of the apparent skin irritating properties exhibited by the vapors of some of the materials, the investigator considered it of practical value to determine what effects might occur from skin painting studies. A set technique, using quantitative amounts of undiluted test materials, was followed in this procedure. The mouse was selected for this part of the experimental work and some of the important findings to date are:

- (a) C9-C10 aromatics exposure caused -
 - (1) amyloidosis of spleen and liver
 - (2) cortical scarring and sclerosis of kidney
 - (3) loss of hair, and hyperkeratosis, inflammation and ulceration of areas painted.

- (b) C11-C12 aromatics exposure caused -
 - (1) Loss of hair and development of skin changes as above, quicker.

(c) C11-C12 aromatics, benzene and n-decane, cause essentially no kidney change in test animals.

Inasmuch as the results reported by investigators who have done animal experimental work on benzene now seem to be somewhat conflicting, it is the feeling of the subcommittee members that at this time benzene should not be unequivocally accepted as a positive control in our C9-C12 work. Nevertheless, we are cognizant of the possible value of comparing the toxicities of benzene with those of C9-C12 aromatics, and think it advisable that the study of benzene toxicity on animals should be continued in this program.

For these reasons, the subcommittee has restated the objectives of the C9-C12 aromatic toxicity studies as follows:

"The study of the physiological effects of contacts with C9-C10 and C11-C12 aromatic fractions obtained from petroleum distillates, principally by inhalation of these substances using various specie of test animals, and comparing these results with the physiological effects of benzene, and n-decane, on these same species of animals".

Based on the findings to date the subcommittee recommends:

1 - Mice inhalation studies must be pursued further - with evaluation of gross and microscopic changes.

2 - Continuation of inhalation studies on rats - lengthening daily exposure periods for all test materials.

3 - Continue the toxicity study of test materials by skin painting.

4 - Continue present practical hematological studies on test animals with the addition of:

(a) Special emphasis on differential counts.

(b) Hematological studies on animals being tested by skin painting.

(c) Chemical detection - if possible - of test materials in blood stream of animals exposed by skin painting.

5 - Addition of larger species of animals to the testing program as soon as the investigator is ready.

6 - Dr. Nau is to visit Dr. Diechman and V. K. Rowe, Dow Chemical, Midland, Michigan, to compare methods of blood sampling etc. involved in study.

REPORT OF THE SUBCOMMITTEE ON CARCINOGENICITY
TO THE MEDICAL ADVISORY COMMITTEE,
NOVEMBER 13, 1957, CHICAGO, ILL.

1. The work of the Kettering Laboratory, which is at the moment principally analytical in nature, is progressing satisfactorily. The Subcommittee accepts the interim report of the Kettering Laboratory dated September 26, 1957.
2. The Subcommittee proposes that the MAC may wish to recommend to the Medical and Health Committee that the Committee on Fundamental Research of the API consider sponsoring work similar to that done by Dr. Horton on fundamental research in petroleum. Such fundamental research, if sponsored by the Committee on Fundamental Research of the API, could be done either at the Kettering Laboratory or at any other laboratory that the Committee on Fundamental Research chooses. Since certain phases of this work may touch on biological activity, the MAC stands prepared to provide to the Committee on Fundamental Research, one to three members who would offer advice on the biological phases of this work if it is undertaken.
3. The Subcommittee looks with favor on the concept of retaining Dr. Kehoe as a consultant to the MAC on a mutually acceptable basis comparable to that of Dr. Philip Drinker. It is believed that the presence of Dr. Kehoe at the MAC meetings, and expressions of advice and counsel from Dr. Kehoe, similar to those now provided by Dr. Drinker, would be of great value to the MAC.
4. The Subcommittee through its Chairman, solicits the comments and criticisms of all members and advisors of the MAC on the outline of the final report of the Kettering Laboratory which is appended to the interim report of the Kettering Laboratory dated September 26, 1957. Any comments, criticisms or suggestions about this outline should be sent to the Chairman of the Subcommittee.

ESSO STANDARD OIL COMPANY

15 WEST 51ST STREET, NEW YORK 10, N. Y.

APPENDIX F

November 13, 1957

Dr. L. E. Curtis, Chairman
Medical Advisory Committee
American Petroleum Institute

LEO WADE, M. D., F. A. C. P.
MEDICAL DIRECTOR
JOHN J. THORPE, M. D., F. A. C. P.
ROBERT P. SIM, M. D.
ASSISTANT MEDICAL DIRECTOR
GEORGE E. BOCK, M. D.
THOMAS G. FLANN, M. D.
PHYSICIANS
GEORGE M. WILKENING,
INDUSTRIAL HYGIENIST

Your Subcommittee on Dermatitis has been relatively inactive since the last meeting of the M. A. C. The Dermatitis Survey conducted by Doctor Daniel Braun and associates of the Industrial Hygiene Foundation has been prepared for publication in an appropriate medical journal. The manuscript has been reviewed carefully by our committee and minor suggestions made directly to Doctor Braun. We consider it appropriate for publication and see no possible basis for anxiety on the part of the petroleum industry about doing so. We understand the Hygiene Panel of the Lubrication Committee has not given its approval.

We have heard that discussions between Mr. M. D. Gjerde, of the Hygiene Panel, and Dr. Richard Walmer, of the Industrial Hygiene Foundation, have been carried on regarding the preparation of a handbook concerning safe handling of cutting fluids. While formal agreement has not been reached, there seems to be a good possibility that the Industrial Hygiene Foundation staff may agree to undertake this task. We understand that funds remaining from those collected for the survey are adequate to finance this project.

It is suggested that members of the Medical Advisory Committee read, if they have not already done so, a series of papers regarding the general problem of dermatitis due to petroleum products, published in the Journal of the American Society of Lubrication Engineers. There are seven or eight articles so far, beginning about one year ago.

Respectfully submitted,



Leo Wade, M. D., Chairman

Lamson Blaney, M. D.
E. Kern Linder, M. D.
M. N. Newquist, M. D.

API 07324

SUBCOMMITTEE ON ECONOMIC POISONS

- I. Meeting called to order by Chairman at 9:00 A. M., November 12, 1957, Conrad Hilton Hotel, Chicago, Illinois, with all six (6) members present. Many guests from the Medical Advisory Committee and technical advisors participated in the opening discussions preceding the executive session of the subcommittee.
- II. In reference to exhibit C, Minutes of the 23rd M.A.C. Meeting, on the subject of kerosene poisoning:
 - A. The Medical and Health Committee has not yet made a decision regarding the use of A.P.I. funds to help support a general educational program in the prevention of kerosine poisoning outside the petroleum industry, as recommended in the minutes of the 22nd M.A.C. meeting. No further action is necessary by this subcommittee at this time.
 - B.
 1. With reference to the treatment of kerosine poisoning, for which \$5000 is available for support of research, the subcommittee has gathered considerable information in the past six months. In reviewing the literature, in talking with and corresponding with several qualified investigators in the field and in the discussions held at our subcommittee meeting November 12, it is evident that there is no unanimity of opinion regarding the treatment of kerosine poisoning in humans. Although there is general agreement regarding supportive measures, there are divergent schools of thought relating to the practice of the induction of vomiting by medical or mechanical means and the use of stomach lavage.
 2. Careful animal experimentation by one of the subcommittee members, independently engaged in research in this field, has shown that death occurs from hemorrhagic pneumonia in rats, rabbits and chickens, only when the kerosine has been intentionally or accidentally introduced into the respiratory tract. However, those animals receiving large amounts of kerosine into the stomach have not died nor developed pneumonia in spite of high levels of hydrocarbon found in the circulating blood.
 3. This evidence is indicative to the members of the subcommittee that the practice of inducing vomiting or of lavaging the stomach in cases of human poisoning from the ingestion of kerosine is contraindicated and may well increase the risk to the patient.
 4. On the other hand the subcommittee believes that further research is indicated before final conclusions can be accepted.

5. Therefore, it is recommended that this subcommittee pursue this problem further by supporting research by Dr. Carl A. Nau, at the University of Texas, Medical Branch, Galveston, Texas, by additional animal experiments. The subcommittee members will arrange to meet with Dr. Nau to acquaint him with all the information on which we base our current opinion.
 6. The subcommittee will also proceed to review further the field of clinical investigation to see if any project should be recommended to the M.A.C. relating to this problem in the treatment of kerosine poisoning in humans and will report to the M.A.C. at its April, 1958 meeting.
 - C. With reference to Poison Control Centers and the National Clearing House for Poison Control Centers in Washington, D.C., no further information has been received. The Chairman of this subcommittee will again contact Dr. Edward Press for the latest list of Poison Control Centers and the present status of organization of the "Clearing House's" Advisory Council and notify the M.A.C. members of any developments.
 - D. With reference to requesting from the A.P.I. Committee on Agriculture a list of those petroleum products which are used by themselves as economic poisons in agriculture, no action has been taken to date. The subcommittee chairman will attempt to obtain such a list in the near future.
- III. New Business - None.
- IV. The subcommittee requests that this report be accepted by the Medical Advisory Committee.

Respectfully Submitted,

/s/ J. W. Osborn

J. W. Osborn, M.D.
Chairman
Subcommittee on Economic Poisons

APPROVING:

Mr. R. C. Cole
Dr. H. Gerarde
Mr. J. W. Hammond
Dr. M. N. Newquist
Dr. R. Schneider

DISAPPROVING:

NONE

REPORT OF THE SUBCOMMITTEE ON PHYSICAL AGENTS

The Subcommittee on Physical Agents met at 2 p.m., November 12, 1957 with four members and numerous visitors in attendance. The past activities in regard to evaluating the problems of noise and radioactive materials in the petroleum industry were reviewed. This led to a discussion of the objectives and fundamental activities of the subcommittee. It was felt that these should not be carried too far afield outside the industry. In regard to the presentation of its findings to the industry (thru the M.A.C.) it was felt that reports and recommendations should await a specific request. In response to the question of whether the subcommittee should continue in existence, it was decided, with the solicited advice of the visitors led by Dr. V. C. Baird, that there was a definite function to be performed by a medical group assisted by industrial hygienists in keeping abreast of problems in the stated field.

The subcommittee has therefore outlined its modus operandi as follows:

1. Insofar as possible each member will follow developments relative to the medical aspects of exposures to physical agents and keep the M.A.C. informed via the subcommittee of pertinent new information.
2. Significant new material for discussion will be brought to each subsequent meeting of this subcommittee.
3. The literature will be surveyed to a limited extent for pertinent articles which will then be referred to the M.A.C.
4. The subcommittee will hold itself ready to undertake special projects for or present significant material to the M.A.C. upon the latter's request.

Respectfully submitted,

Lamson Blaney, M.D., Chairman
Subcommittee on Physical Agents

APPENDIX E

REPORT OF THE SUBCOMMITTEE ON TOXICOLOGICAL REVIEWS TO THE MAC

H. W. Gerarde, M. D., Chairman

Under the direction of Prof. Drinker, revisions have been prepared on the following Toxicological Reviews:

- | | | |
|-------------|----------------|--------------------------------|
| 1. Benzene | 4. Naphthalene | 7. Copper Naphthenate |
| 2. Cumene | 5. Xylene | 8. Toluene |
| 3. Kerosine | 6. Cyclohexane | 9. Aromatic Solvent
Naphtha |
| | | 10. Naphthenic Acids |

Revisions on Mesitylene and Methylcyclohexane were not prepared since no new data has appeared since they were published. Drafts of the reviews were circulated to members of the subcommittee and their advisors for comment.

Final drafts incorporating suggested changes are now in preparation. On completion, these will be submitted to the MAC for approval. The subcommittee recommends that they be reprinted, retaining the original API Toxicological Review format with the date of revision and names of the reviewers (Drs. Vallee and Warnock) appearing on the front cover.

The next group of reviews to be revised will include:

- | | | |
|---------------|----------------------|-----------------------|
| 1. Styrene | 5. Nitrobenzene | 9. Furfural |
| 2. Thiophene | 6. Diethylene Glycol | 10. Boron Trifluoride |
| 3. Morpholine | 7. Acrylonitrile | 11. Alkyl Disulfides |
| 4. Phenol | 8. Nickel Carbonyl | 12. Alkyl Mercaptans |

The committee suggests that the section on "Probable Sources of Contact" in the Toxicological Reviews be written by members of the Industrial Hygiene Committee.

The committee recommends that the MAC circularize other API Divisions for suggestions of chemicals to be included in a list of new Toxicological Reviews which will be prepared after the existing reviews have been brought up to date.

Total expenditures up to date for the work completed is \$1,400.00.

The Subcommittee requests that this report be accepted.

Respectfully submitted,

H. W. Gerarde, M. D.

APPENDIX I

REPORT OF THE SUBCOMMITTEE ON INDUSTRIAL HYGIENE

PAUL D. HALLEY, CHAIRMAN

The Industrial Hygiene Subcommittee met November 13, 1957 with 9 members and 9 guests present.

The subcommittee received a liaison report on the activities of the ASA Z-37 Committee on Maximum Allowable Concentration, as follows:

Letter ballots on three standards have been sent to all Z-37 Committee members.

Methyl chloride	100 ppm.
Styrene monomer	400 ppm. (slight discomfort at 100 ppm.)
Toluene	200 ppm. (slight discomfort at 100 ppm.)

Proposed standards for nine other materials are being checked by the Editorial Subcommittee prior to being voted on by the Z-37 Committee.

No meeting of the Z-37 Committee is scheduled in the near future.

No activity was reported by the ASA Z-4 Committee on Industrial Sanitation and the ASA Z-62 Committee on Industrial Hygiene.

Mr. J. W. Hammond reviewed some of the highlights obtained from a recent course on the use of radioisotopes in the petroleum industry. This subcommittee anticipates no planned activity in this field unless so requested by the Subcommittee on Physical Agents.

Mr. N. V. Hendricks was designated to serve as liaison member with the Subcommittee on Toxicological Reviews. He is to inquire as to the desirability of including in each toxicological review a brief summary of the uses and possible sources of contact to be expected in the petroleum industry.

It was generally agreed that the Subcommittee on Industrial Hygiene should briefly review all present and future MAC projects for the purpose of determining whether there is a need for setting up evaluation and control procedures applicable to the petroleum industry. It would be kept in mind that this should deal primarily with general principles rather than specifics.

As an example of this, the subcommittee will summarize all products containing C₉-C₁₂ aromatics for the purpose of appraising possible contacts. This will be reported to the MAC to

assist in their appraisal of the findings reported by the Subcommittee on C₉-C₁₂ Aromatics. If the MAC then feels that there is a need, the Subcommittee on Industrial Hygiene will advise on adequate control measures, including safe handling procedures. Mr. L. E. Renes was designated as liaison member with the Subcommittee on C₉-C₁₂ Aromatics.

The Subcommittee agreed as a project to prepare pertinent information on the various catalysts used in the petroleum industry to be used by the MAC. Suggestions will be made to the Committee on Toxicological Reviews where it is believed a review of a particular catalyst would be of value.

Paul D. Halley
Chairman